

CLAIMS:

1. An apparatus for replacing at least a portion of an intervertebral disc in a spinal column, comprising:

a first member having a first vertebral contact surface for engagement with an endplate of a first vertebral bone in the spinal column; and

a second member having a second vertebral contact surface for engagement with an endplate of a second vertebral bone in the spinal column, wherein:

an intervertebral disc space is defined substantially between the first and second endplates of the first and second vertebral bones, and

the first and second members are operable to articulate relative to one another, when disposed in the intervertebral disc space, about at least one of: (i) a first center of rotation for at least one of flexion and extension that is located outside the intervertebral disc space, and (ii) a second center of rotation for lateral bending that is located outside the intervertebral disc space.

2. The apparatus of claim 1, wherein the first center of rotation is located outside the intervertebral disc space in one direction and the second center of rotation is located outside the intervertebral disc space in an opposite direction.

3. The apparatus of claim 1, wherein:

the first member includes a first articulation surface; and

the second member includes a second articulation surface,

wherein the first and second articulation surfaces are sized and shaped to engage one another when the first and second members are disposed in the intervertebral disc space to enable at least one of flexion, extension, and lateral bending.

4. The apparatus of claim 3, wherein:

the first articulation surface is defined by a concave arc, generally of radius A about a first axis substantially perpendicular to an anterior-posterior plane of the spinal column, and a convex arc, generally of radius B about a first axis substantially perpendicular to a lateral plane of the spinal column; and

the second articulation surface is defined by a convex arc, generally of radius C about a second axis substantially perpendicular to the anterior-posterior plane of the spinal column, and a concave arc, generally of radius D about a second axis substantially perpendicular to the lateral plane of the spinal column.

5. The apparatus of claim 4, wherein the first and second articulation surfaces are sized and shaped to engage one another when the first and second members are disposed in the intervertebral disc space to enable the first and second vertebral bones to at least axially rotate relative to one another through a range of angles.

6. The apparatus of claim 5, wherein the radius A of the concave arc is greater than the radius C of the convex arc in order to permit axial rotation of the first and second vertebral bones relative to one another.

7. The apparatus of claim 5, wherein the radius D of the concave arc is greater than the radius B of the convex arc in order to permit axial rotation of the first and second vertebral bones relative to one another.

8. The apparatus of claim 5, wherein the first and second articulation surfaces are sized and shaped to achieve substantial point-to-point contact relative to one another when the spinal column is in at least some positions of flexion, extension, lateral bending, and/or axial rotation.

9. The apparatus of claim 5, wherein the first and second articulation surfaces are sized and shaped to engage one another when the first and second members are disposed in the intervertebral disc space to enable the first and second vertebral bones to axially rotate relative to one another through the range of angles without substantially displacing the first and second vertebral bones away from one another.

10. The apparatus of claim 9, wherein the range of angles is about plus/minus three degrees from a resting position.

11. The apparatus of claim 9, wherein the first and second articulation surfaces are sized and shaped such that the first and second vertebral bones are displaced away from one another at axial rotations outside the range of angles.

12. The apparatus of claim 4, wherein at least one of: (i) the first and second axes perpendicular to the anterior-posterior plane of the spinal column are substantially coaxial; and (ii) the first and second axes perpendicular to the lateral plane of the spinal column are substantially coaxial.

13. The apparatus of claim 4, wherein at least one of: (i) the first and second axes perpendicular to the anterior-posterior plane of the spinal column lie in a plane that is substantially perpendicular to the anterior-posterior plane; and (ii) the first and second axes perpendicular to the lateral plane of the spinal column lie in a plane that is substantially perpendicular to the lateral plane.

14. The apparatus of claim 3, wherein the first and second articulation surfaces are saddle shaped such that they are operable to engage when the first and second members are disposed in the intervertebral disc space to articulate in at least one of flexion, extension, and lateral bending.

15. An apparatus for replacing at least a portion of an intervertebral disc in a spinal column, comprising:

first means for engagement with an endplate of a first vertebral bone in the spinal column; and

second means for engagement with an endplate of a second vertebral bone in the spinal column, wherein:

an intervertebral disc space is defined substantially between the first and second endplates of the first and second vertebral bones, and

the first and second means are operable to articulate relative to one another, when the first and second means are disposed in the intervertebral disc space, about at least one of: (i) a first

center of rotation for at least one of flexion and extension that is located outside the intervertebral disc space, and (ii) a second center of rotation for lateral bending that is located outside the intervertebral disc space.

16. An apparatus for replacing at least a portion of an intervertebral disc in a spinal column, comprising:

a first member having a first vertebral contact surface for engagement with an endplate of a first vertebral bone in the spinal column, and having a first articulation means; and

a second member having a second vertebral contact surface for engagement with an endplate of a second vertebral bone in the spinal column, and having a second articulation means, wherein:

an intervertebral disc space is defined substantially between the first and second endplates of the first and second vertebral bones, and

the first and second articulation means are operable to articulate relative to one another, when the first and second members are disposed in the intervertebral disc space, about at least one of: (i) a first center of rotation for at least one of flexion and extension that is located outside the intervertebral disc space, and (ii) a second center of rotation for lateral bending that is located outside the intervertebral disc space.